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TECHNOLOGY CENTER 2800

REPLY UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 2814

AF
2814

BOX AF

PATENT

2342-107B

SEP 11 2000
MITSUHIRO HIRANO
9/13/00

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Mitsuhiro HIRANO

Appl. No.: 08/813,200

Group: 2814

Filed: March 7, 1997

Examiner: M. DIETRICH

For: SUBSTRATE PROCESSING APPARATUS WITH LOCAL
EXHAUST FOR REMOVING CONTAMINANTS (AS
AMENDED)

(Fee on
Notice of
Appeal)

LARGE ENTITY TRANSMITTAL FORM
FOR REPLY AFTER FINAL UNDER 37 C.F.R. § 1.116

BOX AF

Assistant Commissioner for Patents
Washington, DC 20231

September 7, 2000

Sir:

Transmitted herewith is an amendment in the above-identified application.

The enclosed document is being transmitted via the Certificate of Mailing provisions of 37 C.F.R. § 1.8.

The enclosed document is being transmitted via facsimile.

The fee has been calculated as shown below:

	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			PRESENT EXTRA	RATE	ADDITIONAL FEE
TOTAL	4	-	26	=	0	\$ 18	\$ 0.00
INDEPENDENT	4	-	4	=	0	\$ 78	\$ 0.00
FIRST PRESENTATION OF A MULTIPLE CLAIM						\$260	\$ 0.00
						TOTAL	\$ 0.00

Petition for three(3) month(s) extension of time pursuant to 37 C.F.R. §§ 1.17 and 1.136(a) is being filed, along with the necessary extension fees, together with the Notice of Appeal, concurrently herewith.

No fee is required.

A check in the amount of \$0.00 is enclosed.

Please charge Deposit Account No. 02-2448 in the amount of \$0.00. This form is submitted in triplicate.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By

Michael K. Mutter, #29,680

P.O. Box 747

Falls Church, VA 22040-0747

(703) 205-8000

MKM/krm
2342-107P

(Rev. 04/19/2000)

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BOX AF
RESPONSE UNDER
37 C.F.R. § 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 2814

PATENT
2342-107P

#18/E(10)
D/M
9/20

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Mitsuhiro HIRANO

Appl. No.: 08/813,200 Group:2814

Filed: March 7, 1997 Examiner: M. Dietrich

For: SUBSTRATE PROCESSING APPARATUS
WITH LOCAL EXHAUST FOR REMOVING
CONTAMINANTS (AS AMENDED)

RESPONSE

Box AF
Assistant Commissioner for Patents
Washington, DC 20231

September 7, 2000

Sir:

Responsive to the Office Action dated March 7, 2000, the period for response having been extended by the concurrent filing of a Notice of Appeal to September 7, 2000, the following amendments and remarks are respectfully submitted under 36 C.F.R. § 1.116 in connection with the above-identified application.

IN THE CLAIMS:

Please amend claims 11 and 18 as follows:

11. (Thrice amended) A substrate processing apparatus comprising:
a substrate processing chamber for processing a substrate;

a load lock chamber;

a gas supply for supplying gas into said load lock chamber;

a chamber exhaust for exhausting said load lock chamber, said chamber exhaust including an atmospheric pressure vent line and a vacuum exhaust line which is to be connected to a vacuum pump, pressure at one end of said atmospheric pressure vent line being substantially equal to the atmospheric pressure and the other end of said atmospheric pressure vent line being connected with said load lock chamber,

a moving mechanism provided in said load lock chamber for moving said substrate;

a local exhaust for locally exhausting a dust generating portion of said moving mechanism;

a flow rate regulator in one of said gas supply, said chamber exhaust and said local exhaust;

a first valve disposed at an intermediate portion of said vacuum exhaust line;

a second valve disposed at an intermediate portion of said atmospheric pressure vent line;

a controller; and

a pressure detector for detecting pressure in said load lock chamber,
wherein

said first and second valves are controlled by said controller such that during movement of said substrate by said moving mechanism, said first valve is closed and said second valve is opened, and

 during movement of said substrate by said moving mechanism, said controller controls said flow rate regulator in accordance with a signal from said pressure detector to keep the inside of said load lock chamber at a higher pressure level than the atmospheric pressure.

18. (Four times amended) A substrate processing apparatus comprising:

 a substrate processing chamber for processing a substrate;

 a load lock chamber;

 a gas supply for supplying gas into said load lock chamber;

 a chamber exhaust for exhausting said load lock chamber;

 a moving mechanism provided in said load lock chamber for moving said substrate;

a cover for covering a dust generation portion of said moving mechanism;

 a local exhaust for locally exhausting a dust generating portion of said moving mechanism;

 a flow rate regulator in one of said gas supply, said chamber exhaust and said local exhaust;

a partition plate provided in said load lock chamber for partitioning [sid]
said load lock chamber into a first region in which said substrate is moved and a
second region in which said moving mechanism is positioned; and

a slit provided in said partition plate, wherein

said gas supply is connected with said load lock chamber at the first
region of said load lock chamber in which said substrate moves,

said chamber exhaust is connected with said load lock chamber at the
second region of said load lock chamber in which said moving mechanism is
provided,

said local exhaust being connected to a space covered by said cover, said
chamber exhaust being connected to said space, and

gas supplied by said gas supply into the first region in which said substrate
is moved is made to flow into the second region in which said moving mechanism is
positioned, and them to flow into said chamber exhaust and said local exhaust.

REMARKS

Claims 10, 11, 16, and 18 are pending in the present application.

At the outset, it is respectfully submitted that the claims of the present
application are clearly allowable for the reasons presented below and should be
passed to issue. However, to the extent that these claims are not considered
allowable by the Examiner, Applicants respectfully traverse the finality of the
outstanding Office Action. The outstanding Office Action is the third substantive
Office Action (including the Advisory Action of February 10, 2000) in the present

application. However, in the first substantive Office Action dated March 12, 1999, all presently pending claims were indicated allowable by the Examiner. This position was maintained until the outstanding Office Action where these claims for the first time rejected by the Examiner. As of the Advisory Action of February 10, 2000, these claims were still considered allowable and in response to this action, these claims were presented in independent form.¹ Thus, Applicants have never had an opportunity to respond to the outstanding rejection or amend the claims. For this reason, it is submitted that the finality of the outstanding Office Action is premature. Reconsideration and withdrawal of the holding of finality is requested.

The Examiner has requested a full translation of JP-06-002676. As the Examiner is aware, Applicants supplied a partial translation of this reference in an Information Disclosure Statement dated September 22, 1999. This is the most complete translation available to Applicants. Applicants believe this to be a translation of all material portions of this Japanese publication. The non-translated portions are not believed material and no translation is presently available.

The Examiner has objected to claim 18 due to a typographical error. In response to the Examiner's objection, this claim has been amended to make the requested correction. Reconsideration and withdrawal of this rejection is accordingly respectfully requested.

¹ See the last paragraph of page 7 of the Response After Final Under 37 C.F.R. 1.116 dated February 22, 2000.

The Section 112 rejection

The Examiner has rejected claim 16 under Section 112, ¶ 2, alleging that this claim is indefinite due to the recitation:

“a local exhaust, connected with said first vacuum exhaust line and not connected with said load lock chamber, for locally exhausting a dust generating portion of said moving mechanism.”

The Examiner alleges that it is unclear what else the local exhaust is connected to. This rejection is respectfully traversed for the following reasons.

It is respectfully submitted that the Examiner confuses breadth with indefiniteness in this rejection. The Examiner's allegation is not that the claimed limitation is unclear, instead it is that the claimed element has additional connections other than those specifically recited in the claim. This is not a proper § 112, ¶ 2 rejection as it pertains not to what is claimed but to what is not claimed. Section 112 does not require the claiming of an element, only that all claimed elements be claimed with definiteness. The rejection should be withdrawn for this reason.

The Art Rejections

The Examiner, for the first time in the outstanding Office Action, rejected claims 10, 11, and 16 under 35 U.S.C. § 102(b) as being anticipated by JP-06-002676. This rejection is respectfully traversed for the following reasons.

The Teachings of JP-06-002676

JP-06-002676 discloses a substrate processing apparatus as illustrated in Figure 1, which includes a substrate processing chamber (“clean space”13); a load lock chamber 10; a gas supply 1; a chamber exhaust including an

atmospheric pressure vent line 7 and a vacuum exhaust line 3 which is connected to a vacuum pump (not shown). This publication also discloses a moving mechanism 11; a local exhaust 14; flow rate regulators in the gas supply and the local exhaust 2, 16; a first valve in the vacuum exhaust line 5; a second valve in the atmospheric pressure vent line 8; a controller (not shown); and a pressure detector 4.

The '676 Japanese publication is intended to solve a problem that when a gate valve 12 is opened to open the load lock chamber to another load lock chamber or the atmosphere, an amount of N₂ gas flowing into the replacement gas discharging pipe 7 is reduced, and particles generated from a driving section, which were previously discharged out the replacement gas discharging pipe 7, diffuse and contaminate the clean space (transferring region of a wafer) 13 in the load lock chamber 10.² To solve this problem, when the gate valve 12 is opened to open into the atmosphere or another load lock chamber, the discharging amount of N₂ gas is adjusted³ by adjusting the flow rate using the flow meter 16 provided in the vacuum discharging pipe 16, thus preventing amount of the N₂ gas discharged through the replacement gas discharge pipe 7 and the vacuum discharging pipe 14 from being reduced.⁴

If the discharging amount is over-increased to make the inside pressure of the load lock chamber 10 lower than the atmospheric pressure, when the gate valve 12 is opened to open the load lock chamber into another load lock chamber

² See paragraph [0003] of the translation of the '676 Japanese publication.

³ Keeping in mind the problem to be solved, it is apparent that this adjustment is to increase the decharging amount.

⁴ See paragraph [0011] of the translation of the '676 reference.

or the atmosphere, the flow in the load lock chamber 10 flows toward the discharge pipe⁵, avoiding particle diffusion problems.

If the inside pressure of the load lock chamber 10 is higher than the atmospheric pressure when the gate valve 12 is opened, there is flow toward the atmospheric pressure side to make the atmosphere of the inside of the load lock chamber including the driving section flow toward the atmospheric pressure side, which results in particle diffusion. Therefore, due to the problem to which this reference is directed, the load lock chamber is discharged so that the pressure of the inside of the load lock chamber becomes lower than the atmospheric pressure.

The '676 reference also recognizes that it is possible to discharge particles by more appropriate N₂ gas discharge, by controlling the supply amount of N₂ gas using the mass flow controller 2, and by monitoring the internal pressure of the load lock chamber 10 using pressure gauge 4, when the gate valve 12 is closed.⁶ While no specific control method is disclosed, there is no need to control the atmosphere of the inside of the load lock chamber to be greater than atmospheric pressure, nor would such control be beneficial. In the cited reference, even if the pressure on the inside of the load lock chamber becomes lower than the atmospheric pressure as described above, the load lock chamber is discharged by a local exhaust amount without generating a back flow and diffusion from the vent pipe (vent 9). This is because the local line (the

⁵ This is because the pressure inside the load lock chamber, and the pressure in the discharging pipes, are lower than the atmospheric pressure, so that a flow from the atmospheric pressure side is generated.

⁶ See lines 1, 2 of paragraph [0012] of the translation of the '676 reference.

vacuum discharging pipe 14) is connected to the vent line (vent 9). Thus, even if the inside of the load lock chamber is at a relatively low pressure, because the local line (the vacuum discharging pipe 14) is connected to the vent line (vent 9), the backflow from the vent line is discharged by the local line, avoiding the problem the '676 references seems to correct. On the contrary, even if the local line (the vacuum discharging pipe 14) and the vent line (vent 9) remain unconnected, the back flow from the vent line leads to particle diffusion.

Thus, it is apparent that in the '676 Japanese document, because the dust generation portion is not directly covered, the particles are floating in the driving section space. In this state, if the inside pressure of the load lock chamber is made positive (higher than atmospheric pressure), the amount of N₂ gas introduced into the load lock chamber becomes larger than that of the evacuated N₂ gas, causing a relatively large amount of disturbed particles in the atmosphere of the driving section of space. Therefore, in the device of the applied reference, it may not be beneficial to control the inside of the load lock chamber to greater than atmospheric pressure.

The Pending Claims Distinguish Over The Applied References

Claims 10 and 11 each recite:

“said first and second valves are connected by such controllers such that during movement of said substrate by said moving mechanism, said first valve is closed and said second valve is opened.”

Note that both claims also recite that the first valve is disposed in the vacuum exhaust line and the second valve is disposed in the pressure vent line.

To reject these limitations of claims 10 and 11, the Examiner states that the first and second valves in the cited reference are controlled by a controller so that during movement of the substrate the first valve 5 is closed and the second valve 8 is open. However, this is not a correct understanding about the operation of valve 8 in the applied reference. The valve 8 of JP06-002676 is a check valve. The function of which is to prevent back flow. Thus, the second valve is never controlled by a controller as specifically recited in the claim and the Examiner's rejection is accordingly deficient for this reason.

With regard to claim 11, the Examiner alleges that, during movement of the substrate, the gas supply is controlled by the flow regulator 2 to be greater than the exhaust amount from the local exhaust 14 and the chamber exhaust, so that the pressure in the load lock chamber is greater than the atmospheric pressure. However, the applied references does not control the gas supply controlled by the flow regulator 2 to be greater than the exhaust gas amount from the local exhaust 14 and the chamber exhaust. Thus, the applied reference does not suggest that the pressure in the load lock chamber should be greater than the atmospheric pressure. Instead, the reference normally maintains the pressure of the load lock chamber to below atmospheric pressure, for reasons discussed above.

From the above explanation, it is apparent that claims 10 and 11 are not anticipated by the applied reference and patentably distinguish over the applied reference for the reasons set forth above.

Claim 16 recites "a second vacuum exhaust line which is connected with said substrate processing chamber and said first vacuum exhaust line". This feature is not shown or suggested by the '676 Japanese reference. In the '676 Japanese reference, the local exhaust lines 20, 21, and 22 of the substrate processing apparatus illustrated in Figure 2 are not connected with the atmospheric vent line 14. Thus, claim 16 is not anticipated or rendered obvious by the '676 Japanese patent document. For all of the above stated reasons, reconsideration withdrawal of the rejections of claims 10, 11, and 16 are respectfully requested. The Examiner is respectfully requested to reconsider withdrawing his rejection as it applies to these claims.

The examiner further rejects claim 18 as being obvious over "JP 06-002676" in view of Suzuki. This rejection is respectfully traversed for the following reasons.

The Examiner attempts to add the teachings of the Suzuki reference to his basic reference to correct its deficiencies in teaching the limitations of independent claim 18. The '676 Japanese document and the present application are directed to substrate processing apparatus. However, the Suzuki reference relied on by the Examiner is a secondary reference in the present application is directed to clean room technology and thus is not analogous to the substrate processing art to which the present application is directed. Thus, it is respectfully submitted that the teachings of the Suzuki patent are not relevant to the present application.

In any event, claim 16 now requires the local exhaust to be connected to a space covered by a cover for covering a dust generating portion of the moving mechanism. Claim 18 further requires that the chamber exhaust is not connected into this space. These limitations are not shown or suggested by either reference applied by the Examiner and therefore patentably distinguishes over the Examiner's rejection combination.

For the above stated reasons, it is respectfully submitted that claim 18 patentably distinguishes over the rejection applied by the Examiner. The Examiner is accordingly respectfully requested to reconsider and withdraw this rejection to the extent that it applies to claim 18, as amended.

Withdrawal of Finality

It is respectfully submitted that the amendments presented here and above render the amended claims patentable over the references applied by the Examiner. It is therefore respectfully submitted that these amendments should be entered and the present application should be passed to issue. It is also respectfully submitted that the finality of the outstanding Office Action is premature as none of the claims of the present application have been twice rejected by the Examiner's rejection based primarily on '676 Japanese patent publication, and as our last response did not substantively amend the scope of these claims, instead merely placing allowable dependent claims into independent form. Consequently, should the Examiner not be persuaded to allow the claims of the present application, the Examiner is requested to

withdraw the finality of the outstanding Office Action and issue a new Office Action.

For all of the above stated reasons, reconsideration and withdrawal of all outstanding rejections and allowance of claims 10, 11, 16, and 18 are respectfully requested.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants petitioned for an extension of three months to September 7, 2000 for the period in which to file a response to the Office Action dated March 7, 2000 in the concurrently filed Notice of Appeal. The required fee has been paid in connection with the proper filing of this Notice of Appeal.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By


Michael K. Mutter, #29,680

MKM/krm

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000